



R E P O R T
OF
A RECONNOISANCE
ROUTE FOR A RAILROAD
FROM
PORTLAND TO MONTREAL.

BY JAMES HALL, CIVIL ENGINEER.

PORTLAND:
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R E P O R T .

To the Mayor and Aldermen of the City of Portland.

GENTLEMEN :—Having been honored by you, on the 21st October last, with the appointment to make a reconnaissance to ascertain the practicability of a railroad route from this city to the Canada Line, to connect with a route from the Boundary to Montreal ; in which project our citizens generally have expressed such a lively interest, as promotive of the permanent prosperity not only of this city, but of our whole State, I without any loss of time commenced the examination, on the 23d of the same month. The season had already too far advanced to make a minute examination of the whole distance, before winter should set in, and as it was desirable that as much information as possible should be obtained before the assembling of the Legislature, that, if the project was feasible, a charter might be obtained, and other preliminary steps taken, so as to insure the earliest possible success of the enterprise, in accordance with your suggestions, and those of other gentlemen interested, I proceeded at once to the interior to examine the more difficult parts of the route, through the forests, among the highlands, trusting to the general information I had already acquired of the intermediate distance and such as I could cursorily obtain,

for a description of this part of the route. With this plan in view, I proceeded to Andover—and before leaving that place, secured the services of JOHN M. WILSON, Esq. of Township No. 5, Second Range, a practical Surveyor, and best acquainted of any in that region, with the route from Andover to Magalloway river and the lakes to the boundary, which your instructions indicated as the one to which my special attention should be first directed. The other route by Dixville Notch to Colebrook and Canaan, and thence to Compton and Sherbrooke, in Canada, I left for examination on my return. As the result has proved I now regret that my first attention had not been given to this route, that I might have had more time to devote to it.

Soon after leaving the settlements it commenced storming; rains and snows prevailing for most of the time during my examination; and in passing over the route from Andover to the head waters of the Magalloway, and across the boundary to the first settlements on the Canada side, seventeen days were diligently spent in the wilderness, with the snow for most of the distance fifteen inches deep, and our progress along the streams, obstructed by a low growth of fir, spruce, and cedar, which grows very dense, and was heavily loaded down with snow, which added much to the difficulties we had to encounter; and all combined, prevented me from obtaining so full and satisfactory a view of the surrounding region as could have been desired.

In describing the country traversed, little need be said, as to that part which lies between this city and the Androscoggin River, at Rumford. Beyond that point, to the North and West, the whole region presents a bold and

rugged aspect. High mountains and swelling hills, deep vallies, lakes, and ponds, with rivers and brooks running in every direction, as they wind their courses to their outlets, form the entire face of the country, presenting at first sight an impassable barrier against the construction of even the common highway, and much more so to that of a railroad track. The whole country north of Andover, on the Magalloway route to the boundary, is yet a wilderness, and no settlements are found after passing the boundary line, within thirty miles of it, on the Canada side. On the Western route, on the contrary, by the Dixville Notch, scattered settlements, and a travelled road near the route, are to be found for most of the distance to Colebrook, and onward to the Canada line, and inhabitants are constantly settling in that region, and opening and improving the country.

You will at once perceive, from the foregoing statement, that the short space of time, which the season has permitted me to devote to this reconnoissance, and the many difficulties I have had to encounter from the inclemency of the weather, must necessarily have prevented me from making such a thorough examination, as could be entirely satisfactory to myself, yet I have spared no efforts to accomplish all that circumstances would admit.

One route, of which I thought very favorably, leaves Portland in the direction of North Yarmouth, crosses the outlet of Back Cove, near Tukey's Bridge, on a pile bridge about half a mile long; thence passes over a neck of land, forming Martin's Point, to the outlet of Presumpscot River, where a pile bridge will be required, extending half a mile in length; it then passes over favorable ground

to the valley of Mill or Muscle Brook, and up that valley to Buxton's Corner. Or, in crossing Presumpscot River, the line may be carried farther west, in a more direct course, by making a pile bridge, a distance of about two miles, and then entering the same valley, and following it as before mentioned.

From Buxton's Corner, the route inclines more northerly, over favorable ground, passing west of the upper village of North Yarmouth, and east of Walnut Hill meeting-house, to the valley of Royal's River, which it follows up to a summit dividing the waters of that river from those that empty into the Little Androscoggin. It then pursues the course of a range of ponds, over favorable ground, passing near Poland Corner, to the outlet of the Hogan Ponds, near the Little Androscoggin. It then takes the valley of the Little Androscoggin, and follows it about twenty-four miles, to Bryant's Pond, near Bacon's Hill summit. From this pond, the route follows down the valley of a brook to Concord River, and over favorable grounds bordering this river, and along the meadows of the Androscoggin, to Rumford Point, at the junction of the Androscoggin and Ellis Rivers, the distance is about nine miles. A bridge about 450 feet long will be required to cross the Androscoggin, at the north side of Ellis River. The route then follows up the valley of Ellis River, crossing it occasionally to shorten the distance, or to avoid uneven grounds, to Andover, which is ten miles from Rumford.

The whole distance from Portland to Andover, is computed at seventy-two miles, and the most of this distance may be considered as unusually favorable for the location

of a railroad. The gradations will be easy, excepting at one point, namely, at Bacon's Hill summit, where, however, the rise will not exceed sixty feet per mile, and that for one mile only; and the curves will in no place be less than one thousand feet radius, and generally will far exceed that length.

NORTHERN ROUTE.

From Andover, which I designated at the commencement of the NORTHERN OR MAGALLOWAY ROUTE, to the outlet of Richardsons' Lake, called the Narrows, I was not able to examine personally, owing to the necessity of getting our provisions and baggage to that place before the waters were closed with ice, but I gained very satisfactory information in regard to that part of the route, from men long familiar with it. And this distance was also traversed by Col. Long, in his reconnoissance in the summer of 1835, and I shall adopt his description of it, somewhat abridged.

Leaving Andover, the route passes up along the main west branch of Ellis River, crossing two of its tributaries, and on the westerly slopes of Boggy Brook, to the easterly slope of Round Hill, and then on the slope of this hill, until it enters the valley of Black Brook, which it pursues quite to its source, in the vicinity of Lake Welakenneba-cook, a distance of ten miles. The first two miles of this distance are over uneven ground, requiring much cutting and filling, together with two considerable bridges, the grades rising to forty or fifty feet per mile. The next five

miles of this distance are over rugged and steep side hills, requiring much deep cutting and heavy side walling, the grades being not less than sixty feet per mile. The remaining three miles, to the lake, is on flat swampy land.

The route then traverses the northerly shore of the lake, either upon flats or steep hill sides, to the outlet of Richardson's Lake, called the Narrows, about six miles. At this point, my route leaves Col. Long's, and crossing the Narrows, follows along the Westerly shore of the Lake to its northwestern source, about seven miles, and then inclines more westerly over a rise of land connected with the east side of Azisiscoois Mountain, to the Magalloway River, about three miles. The route then follows up the Magalloway to its source, which is within three-fourths of a mile of the boundary line on the Highlands, a distance of thirty-five miles.

Fourteen miles up this river is Lake Pamachena, three miles in length and one in breadth, and through which this river flows. The first ten miles of this distance of the route, must follow the valley of this river, with very slight grades, occasionally crossing the river by bridges, to shorten the distance and avoid projecting points and uneven ground, and with embankments and some walling along its banks, to prevent the overflowing of the road in freshets. For the remaining four miles it must follow along the slopes of the hills, to overcome the rise of the Lake, with heavy embankments and side walling, and rock excavation. The grades for the first two miles will be from twenty-five to fifty feet per mile, and the last two miles at sixty feet per mile.

From the outlet of Pamachena Lake, the route passes

on the eastern shore, and continues up the stream to the East Branch of the river, a distance of nine miles; thence to the West Branch, five miles, over uneven ground; and in no place the gradations need exceed forty feet per mile.

From the outlet of the West Branch, the route passes up the valley of the Middle Branch; the first three miles requiring heavy embankments, side walling, and some rock excavation; and the grades must be about ninety-three feet per mile. Thence succeeds two miles of level, by a range of ponds; thence one mile with a rise of one hundred feet, which may be overcome by a grade of fifty feet per mile, by commencing back one mile, and keeping on the slope of the hills adjoining the ponds. From this to the boundary is one mile and three-fourths. A part of the distance embraces the shore of a pond, which is the source of the Magalloway, and the last three-fourths of a mile rises one hundred and thirty feet, which must be overcome by keeping along the slopes of the hills, and dividing the grade equally for the whole distance; which will, in that case, be about seventy-five feet per mile.

From the boundary, the route passes down the valley of Salmon River, a distance of forty miles, passing Victoria to the river St. Francis, and thence by the river St. Francis to Sherbrooke—distance about thirty-five miles.

WESTERN ROUTE.

From Andover, the WESTERN ROUTE passes up the valley of Sawyer's Brook to a summit, ten miles, dividing the waters of this stream and Dead Cambridge Stream, which empties into Lake Umbagog. For the most of this

distance the grades will vary from fifty to eighty feet per mile, with heavy embankments, side walling and some rock excavations. On this summit, a deep cut will be necessary, and a heavy embankment, and side walling, for a distance of a mile from it, along the northerly side of C Pond, to descend to the flats, which extend along Dead Cambridge Stream, quite to the lake shore, distance seven miles; and passing New Hampshire line a little before reaching the Lake.

The route then crosses the Lake, at the Narrows, where the water is shoal and favorable for the erection of a bridge, which will be half a mile long.

From the Lake, the route passes over flat land along the valley of the Androscoggin, and crosses it, at a distance of about three and a half miles, where a bridge of two hundred feet will be required; thence up the valley of Clear Stream, nine miles, quite to Dixville Notch. From C Pond to the Notch, distance twenty-one miles, the ground is favorable, and in no place the grades will exceed thirty feet per mile, with gentle curves. At Dixville Notch there is a rise of two hundred feet in a distance of three-fourths of a mile, on the easterly side, and a fall of one hundred feet in a distance of one-fourth of a mile, descending on the westerly side; from thence the fall is one hundred and fifty feet, in a distance of one and a half miles, to the valley of the Mohawk River, which the route pursues downward, nine and a half miles, to the Connecticut River, at Colebrook, crossing it to Canaan, Vt., and following up Leach Stream to the 45th parallel, or Boundary line of Canada: distance from Colebrook nine and a half miles. The summit at Dixville Notch must be passed

by a tunnel fifteen hundred feet in length, with the common highway directly over it, and the descent in each direction must be overcome by extending heavy embankments, and side walling, to the flats, so that the grades shall not exceed eighty or ninety feet per mile. The remaining distance to the boundary is favorable for the construction of a railroad.

From the boundary there will be no serious difficulty in passing the Highlands at Hereford, in Canada, by passing up the valley of Leach Stream, and along a range of ponds on nearly the same level, the waters of a part of which fall into Leach Stream, and a part into Mooes River, which runs into the St. Francis, in a very direct course to Sherbrooke.

It is supposed that a route may be found, passing up the valley of the West Branch of Leach Stream, to Wallis or Bradford Pond, and from thence to the Coaticook River down to the St. Francis. That part of the route, along the Coaticook River, I passed over on my return, accompanied by BENJAMIN POMROY, Esq. of Compton, and other gentlemen interested in the enterprise, and I found no serious obstacles to the construction of a railroad.

A route has been spoken favorably of, passing north of Dixville Notch, following up the North Branch of Clear Stream, and thence down the North Branch of the Mohawk, or from the summit in the direction of Canaan.

Another route has been suggested, from Norway Village to the Androscoggin, at Bethel, and thence up Bear River to the summit, and thence down Swift Cambridge Stream to Lake Umbagog, where it would intersect the line I have described as the Western Route.

These, however, I have had no time to examine ; and should the enterprise be undertaken, further examinations will of course be made, and some of the most difficult points on each route, should be tested with instruments, previous to commencing a line of survey.

Sufficient, however, has been accomplished by this reconnaissance to satisfy me of the entire feasibility of constructing a railroad to the boundary, and thence to Montreal ; and that with less difficulties than have been encountered on other roads in our country of equal extent. And I do not hesitate to say, according to my judgment and experience, that no railroad in this country has yet been constructed, of a length equal to the distance from Montreal to Portland, where, taking one part of the route with another, the laying of the land is so favorable, the obstacles and difficulties to be surmounted are so few, and so easy to be overcome, and the facilities and means of construction so cheap and near at hand, as is the case, in these respects, of the route for a railroad from Portland to Montreal. No engineer can pass over the distance without being struck with the favorable conformation of the face of the earth, and courses of the streams—with the passes among and through hills, and across mountain ranges, which nature has prepared beforehand, ready for the industry and enterprise of man to complete the work. Only two serious obstacles are to be found in the whole distance. These, on careful examination, will prove to be less serious than they appear and would be naturally supposed. The rock, for instance, in the Dixville Notch, is of a kind easily displaced and removed, and is needed for

the embankments on the eastern and western sides of the mountain range.

It is obvious to every one that, other things being equal, the nearest and most direct route between the two termini would be the best. From want of the necessary information, to be derived only from careful exploration by practical engineers, it is impossible to determine at the present time which route would, in fact, be the best. Before that question is finally settled, it would be good economy, as well as good policy, to so far examine each and every practicable route, as may be necessary to act understandingly, on a full view of all the facts, and with reference to the best interest of the country. The route mentioned by me, from Portland to Andover, and thence by the Western Route to Montreal, extends in the whole a distance of some three or four miles short of two hundred and fifty.

I cannot conclude this Report, without expressing the obligations I feel myself under to many gentlemen whom I met on the route, who expressed a deep and lively interest in the contemplated work, and who voluntarily aided and assisted me, by accompanying me in many cases, and communicating to me such information as their better knowledge of the features of the country, in their immediate vicinity, enabled them to furnish.

I am, very respectfully,

Your obedient servant,

JAMES HALL, *Civ. Eng.*

PORTLAND, Dec. 2, 1844.

SUPPLEMENTAL REPORT.

To the Mayor and Aldermen.

GENTLEMEN—I received, on the 4th inst., a communication from the Committee of Correspondence, requesting me, in a Supplemental Report to your Board, to state at what sum I have estimated the probable expense of a railroad in the direction suggested by me in my Report, from Portland to the Canada line, near Leach's Stream, taking every thing into consideration, and placing the amount at such a sum, as, from my knowledge of the ground, and of the obstacles to be surmounted, and from my practical acquaintance, I judge would cover the whole expenditure, including the right of way, depots, engines, cars, workshops and other usual appendages necessary for the convenient operation of such a road. They also request me to state my views in regard to the heavy snows in the region through which a railroad from Montreal to Portland must pass; and whether they would or not interpose serious obstacles to the regular and successful operation and use of such a road, in the season of our long winters.

With respect to this latter subject of inquiry, I made it a particular point to inform myself in regard to it. I find that falls of snow are frequent in that region—that the quantity of snow on the ground in the winter season varies from two to three feet in depth; but very seldom

equals three feet. The snows are light and dry, unaccompanied by rain, or sleet, or moisture. It is the damp, heavy snows, sleet, and frozen rain, which create so much difficulty, and constitute so serious an obstacle to the operations of a railroad. A light, dry snow, of any depth that is known to fall in any one storm, is easily removed by the snow-plough now in use. On the seaboard, and further south, the snow and sleet in their season are occasionally serious obstacles; but the further you go north, and the further you recede from the seaboard, the drier and lighter the snow, and the less the difficulty in removing it from the track. As a precaution, however, wherever there are considerable falls of snow, the road bed should be elevated more than where the falls of snow are inconsiderable. This precaution I consider as an important one, in two points of view: 1st, it renders it more easy to keep the track clear of snow; 2d, it saves a good deal of expense in keeping the road in repair. My answer to the latter enquiry is, therefore, that I do not consider that the snow would interpose a serious obstacle to the regular and successful operation and use of a railroad to Montreal, in the winter season.

It will not, of course, be expected of me that I should be able to make any thing like a *calculation* of the whole expenditure necessary to construct and put such a road in successful operation, based upon careful surveys and actual admeasurements. With a view, however, to an estimate of the expense, I made such observations and inquiries, as I passed along over the route, as circumstances would admit. Between this place and Andover, I am quite familiar with the route. With these explanations in regard to the

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SUPPLEMENTAL REPORT.

means I have had of forming a judgment, I submit to you the following estimate, the amount of which, I fully believe, will be found to cover the whole expense :

For grading the road, bridges, masonry for abutments, culverts and cattle guards, and for fencing, &c. &c.

For 112 miles, at \$8,000 per mile,	. . .	\$896,000
" 3 " " 14,000 " "	. . .	42,000
" 5 " " 20,000 " "	. . .	100,000
" 4 " " 30,000 " "	. . .	120,000
" Tunnel at Dixville Notch,	. . .	100,000

\$1,258,000

For railing, including superstructure and laying down the same, 124 miles, at \$8,500 per mile, 1,054,000

For depots, engines, cars, &c. &c. including contingencies, 188,000

Total amount, \$2,500,000

Respectfully, your obedient servant,

JAMES HALL, *Civil Engineer.*

PORTLAND, Dec. 7, 1844.

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